

## **MiniHUM – a miniaturized device to measure trace-humidity on Mars**

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The martian atmosphere contains water vapor, which is temporarily saturated. This leads to an enhanced surface – atmosphere interaction. To understand that interaction better, humidity, as a key-parameter of martian surface physics and photo-catalytic chemistry has to be measured in-situ in its diurnal variations.

Humidity can be measured in-situ by a variety of methods, among them capacitive polymer sensors and dew-point mirror temperature measurements. The Keidel – method, which is shown to be most appropriate for martian thermo-physical conditions, is used for many applications in industrial process monitoring of trace gases. Because the cell functions best for trace contents of water vapor and is more sensitive than capacitive sensors or the standard dew-point mirror method under low-temperature conditions ( $< - 60^{\circ} \text{ C}$ ) it is particularly appropriate for applications under martian conditions, preferably also with a probe for higher concentrations, as an integrated miniaturized capacity probe. The dew-point mirror method is often used as a standard method. The superiority of the miniaturized Keidel cell, as it is used for MiniHUM, with respect to the dew-point standard and with respect to capacitive probes is shown.

MiniHUM is robust and it is with a complete mass of clearly less than 10 g most appropriate to be used in martian in-situ experiments. It is strongly recommended to have a MiniHUM onboard MSL as a “light-weight” device, which could be integrated in another experiment.